

REMARKS

Claims 1-38 are now pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 112

Claims 5 and 6 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point and distinctly claim the subject matter which Applicant regards as the invention. This rejection is respectfully traversed.

The amendments to claim 5 have rendered moot the Section 112 rejections to claims 5 and 6. As such, Applicants submit that this rejection has been traversed.

REJECTION UNDER 35 U.S.C. § 103 – CLAIMS 1-4, 7-8, 10-13, 19-21, 28-30 AND 33-36

Claims 1-4, 7-8, 10-13, 19-21, 28-30, and 33-36 stand rejected under 35 U.S.C. § 103(a) as being anticipated by *Ruffoni* (U.S. Patent No. 5,151,222) in view of *Hedrick* (U.S. Patent No. 5,506,047). This rejection is respectfully traversed.

Independent claims 1 and 21

At the outset, Applicants submit that the above rejection has been rendered moot by the amendments to claims 1 and 21. Claim 1 has been amended to clarify that the air filter includes an electrically absorptive material that is forced into the interior of the substrate, such that the electrically absorptive material penetrates substantially the entire porous substrate and is distributed substantially uniformly throughout the porous substrate. Claim 21 has been amended to clarify that the method includes applying an electrically absorptive solution to the porous substrate and forcing the electrically absorptive solution into the interior of the substrate, such that the electrically absorptive solution substantially completely penetrates the porous substrate and is distributed substantially uniformly throughout the porous substrate.

The Office Action states on page 3 that *Ruffoni* discloses a porous substrate, and admits that *Ruffoni* does not disclose the device being an air filter. Applicants agree that the foam substrate disclosed in *Ruffoni* is not an air filter, and submits that a person of

ordinary skill in the art would not have considered the teachings of *Ruffoni* to address the problem of producing an air filter with an electrically absorptive material or solution that completely penetrates the porous substrate.

The Office Action states on page 3 that *Hedrick* discloses a device being an air filter at column 1, lines 61-65, which recite “a porous material that has high electromagnetic radiation shielding properties...and excellent air flow characteristics.”

But *Hedrick* does not teach the claimed features of “an electrically absorptive material applied to the porous substrate and forced into the interior of the substrate, such that the electrically absorptive material penetrates substantially the entire porous substrate and is distributed substantially uniformly throughout the porous substrate,” as recited in independent claim 1. *Hedrick* also does not teach the claimed features of “forcing the electrically absorptive solution into the interior of the substrate, such that the electrically absorptive solution penetrates substantially the entire porous substrate and is distributed substantially uniformly throughout the porous substrate,” as recited in independent claim 21. Applicants submit that these features provide the claimed air filters with the desired EMI attenuation properties. In view of these recited features, Applicants submit that neither *Ruffoni* nor *Hedrick* teach or suggest each and every claim feature of claim 1 or claim 21. As such, Applicants submit that claims 1 and 21 are allowable for at least these reasons.

With regard to claims 2-4, 7, 8, 10-13, 19-20, 28-30, and 33-36, these claims ultimately depend from claim 1 or 21, which Applicants believes to be allowable in view of the above remarks. As such, Applicants submit that claims 2-4, 7, 8, 10-13, 19-20, 28-30, and 33-36 are also allowable for at least these reasons.

REJECTION UNDER 35 U.S.C. § 103 – CLAIM 9

Claim 9 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Ruffoni* (U.S. Patent No. 5,151,222) in view of *Hedrick* (U.S. Patent No. 5,506,047) in further view of *van Haaster* (U.S. Patent No. 7,135,643). This rejection is respectfully traversed.

Applicants submit that while *van Haaster* may be §102(e) prior art, it does not qualify for purposes of an obviousness rejection under 35 U.S.C. § 103(a) since the

present application and the *van Haaster* patent were subject to an obligation of assignment to the same entity under § 103(c). 35 U.S.C. § 103(c)(1) states:

Subject matter developed by another person, which qualifies as prior art only under one or more of subsections (e), (f), and (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the claimed invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Applicants submit that the *van Haaster* patent (7,135,643) is owned by Laird Technologies, Inc., by virtue of an assignment recorded at Reel 014214, Frame 0671. Applicants submit that the present application is owned by Laird Technologies, Inc., by virtue of an assignment recorded at Reel 017538, Frame 0495. Accordingly, Applicants submit that the *van Haaster* patent and the present application are both co-owned by Laird Technologies, Inc. Applicants also submit that at the time of the present invention, the inventors were subject to an obligation of assignment to Laird Technologies, Inc. Thus, Applicants submit that *van Haaster* is disqualified as a reference under 35 U.S.C. § 103(c) and thus not a proper reference for purposes of an obviousness rejection. Accordingly, Applicants respectfully request reconsideration and reconsideration of the obviousness rejection of claim 9 for at least these reasons.

REJECTION UNDER 35 U.S.C. § 103 – CLAIMS 5, 6, 14, AND 18

Claims 5, 6, 14, and 18 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Ruffoni* (U.S. Patent No. 5,151,222) in view of *Hedrick* (U.S. Patent No. 5,506,047) in further view of *van Haaster* (U.S. Patent No. 7,135,643). This rejection is respectfully traversed.

As just noted, Applicants submit that the *van Haaster* patent (7,135,643) and the instant application are both owned by Laird Technologies, Inc., by virtue of an assignments recorded respectively at Reel 014214, Frame 0671 and at Reel 017538, Frame 0495. Therefore, Applicants submit that *van Haaster* is disqualified under 35 U.S.C. § 103(c) and thus not a proper reference for purposes of an obviousness rejection. Accordingly, Applicants respectfully request reconsideration and reconsideration of the obviousness rejection of claims 5, 6, 14, and 18 for at least these reasons.

REJECTION UNDER 35 U.S.C. § 103 – CLAIMS 15-17

Claims 15-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Ruffoni* (U.S. Patent No. 5,151,222) in view of *Hedrick* (U.S. Patent No. 5,506,047) and *van Haaster* (U.S. Patent No. 7,135,643) and in further view of *Lambert* (U.S. Patent No. 6,870,092). This rejection is respectfully traversed.

As just noted, Applicants submit that the *van Haaster* patent (7,135,643) and the instant application are both owned by Laird Technologies, Inc., by virtue of an assignments recorded respectively at Reel 014214, Frame 0671 and at Reel 017538, Frame 0495. Likewise, the *Lambert* patent (6,870,092) is also owned by Laird Technologies, Inc., by virtue of an assignment recorded at Reel 014130, Frame 0134. Therefore, Applicants submit that *van Haaster* and *Lambert* are both disqualified under 35 U.S.C. § 103(c) and thus not proper references for purposes of an obviousness rejection. Accordingly, Applicants respectfully request reconsideration and reconsideration of the obviousness rejection of claims 15-17 for at least these reasons.

REJECTION UNDER 35 U.S.C. § 103 – CLAIMS 22-27 AND 31-35

Claims 22-27 and 31-35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Ruffoni* (U.S. Patent No. 5,151,222) in view of *Hedrick* (U.S. Patent No. 5,506,047) in further view of *Clough* (U.S. Patent No. 5,633,081). This rejection is respectfully traversed.

The Office Action alleges on page 14 that *Clough* discloses immersing the porous substrate into an electrically absorptive solution to cause the solution to penetrate the porous substrate, extracting the immersed substrate from the solution and removing the excess solution from the substrate to thereby leave a substantially uniform distribution of electrically absorptive solution on the porous substrate. (Column 37, lines 10-19). The Office Action further alleges on page 16 that *Clough* discloses the step of forcing air through the porous material by drawing a vacuum, and the step of removing excess by squeezing the substrate. (Column 37, lines 10-15). The Office Action further alleges on page 18 that *Clough* discloses the step of the porous substrate being sprayed.

Applicants respectfully submit that the Office Action, however, has misinterpreted what *Clough* discloses at column 37, lines 8-19, which states:

Another approach is to apply the $\text{SnCl}_2/\text{SnF}_2$ mixture in a molten form directly to the mats in an inert atmosphere. There are several alternatives for continuously applying the molten mixture to the mats. Obtaining substantially uniform distribution of the mixture on the mats is a key objective. For example, the mats can be compressed between two fillers that are continuously coated with the molten mixture. Another option is to spray the molten mixture onto the mats. The fiber mats may also be dipped directly into the melt. The dipped fiber mats may be subjected to a compression roller step, a vertical lift step and/or a vacuum filtration step to remove excess molten mixture from the fiber mats.

Notably, *Clough* also states (at Column 8, line 66 through Column 9, line 3) that “a particularly unique process and product embodiment of present invention is the preferential coating of the outer porous substrate surface while controlling and/or **limiting** the coating of the internal pores and surfaces of the porous substrate”. (Emphasis added). Thus, Applicants submit that *Clough* does not teach or suggest to one skilled in the art the claim features recited in claim 22 about “immersing the porous substrate into the electrically absorptive solution, causing the electrically absorptive solution to penetrate the porous substrate”. Thus, Applicants submit that claim 22 is not obvious in view of the cited references for at least these reasons.

With regard to claims 25 and 26, *Clough* teaches subjecting the molten coated mats to a vacuum filtration step to remove excess molten mixture from the fiber mats. But *Clough* only suggests to one of ordinary skill in the art to apply a vacuum to draw off excess molten mixture and trapped air from the coated mats, as *Clough* does not teach or suggest the claimed features relating to forcing air through the porous substrate to ensure that pores remain substantially unblocked. Thus, Applicants submit that claims 25 and 26 are not obvious in view of the cited references for at least these reasons.

With regard to claims 23-24, 27, and 31-35, these claims ultimately depend from claim 21, which Applicants believe to be allowable in view of the above remarks. As such, Applicants submit that claims 23-24, 27, and 31-35 are also allowable for at least these reasons.

NEW CLAIMS 37 AND 38

Claims 37 and 38 are supported by the application as originally filed. Accordingly, no new matter is introduced by the addition of claims 37 and 38.

Claim 37 depends from independent claim 21, and further recites that “the electrically absorptive solution comprises an electrical absorber in particulate form suspended in a binding agent.” Claim 38 dependent from independent claim 1, and further recites that “the electrically absorptive solution comprises an electrical absorber in particulate form suspended in a binding agent.” Applicant submits that claims 37 and 38 should be allowable at least because of their dependence from independent claims, which Applicants have shown above to be allowable claim. In addition, each and every one of the features recited in claims 37 and 38 (in combination with the features recited in the independent claims from which they depend) are not disclosed, taught, or suggested by the cited patents.

In the interest of expediting prosecution, Applicants make the following general observations about *Hedrick* - even though these new dependent claims 37 and 38 have not been rejected on the basis thereof. For example, *Hedrick* discloses a porous composite material made of porous electrically conductive materials coated with or laminated to porous hydrophobic or oleophobic materials. But *Hedrick* does not appear to disclose, teach or suggest the use of a binder to attach an electrical absorber in particular form to the *Hedrick* porous materials.

Applicant respectfully directs the Examiner’s attention to page 3 of the attached PCT International Preliminary Examination Report for International Application No. PCT/US03/31119. As stated therein, *Hedrick* (and other patents) “do not teach or fairly suggest the claimed features of an air filter having electromagnetic energy absorptive characteristics including a porous substrate and an electrically absorptive material distributed uniformly through the porous substrate, the electrically absorptive material being an electrical absorber in particulate form suspended in a binding agent nor the method of forming such an air filter.”

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (314) 726-7502.

Applicants believe that the correct fees have been calculated in connection with filing, for which Applicants have authorized the Commissioner to charge to Deposit Account No. **08-0750**. If, however, there is ever any fee deficiency or overpayment under 37 C.F.R. §1.16 or 1.17 in connection with this patent application, the Commissioner is hereby authorized to charge such deficiency or overpayment to Deposit Account No. **08-0750**.

Respectfully submitted,

Dated: October 24, 2007

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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

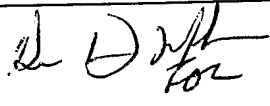
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 37906.107289	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US03/31119	International filing date (day/month/year) 02 October 2003 (02.10.2003)	Priority date (day/month/year) 03 October 2002 (03.10.2002)
International Patent Classification (IPC) or national classification and IPC IPC(7): B01D 46/00 and US Cl.: 055/385.6, 385.7, 524, DIG.5; 174 35R, 35MS; 361/816, 818; 427/244		
Applicant LAIRD TECHNOLOGIES, INC.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
- ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 03 May 2004 (03.05.2004)	Date of completion of this report 29 September 2004 (29.09.2004)
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/ US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer Duane S. Smith  Telephone No. 571-272-0987

Form PCT/IPEA/409 (cover sheet)(July 1998)

I. Basis of the report**1. With regard to the elements of the international application:***

- ☐ the international application as originally filed.
- ☒ the description:
pages 1-17 as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.
- ☒ the claims:
pages NoNE, as originally filed
pages NONE, as amended (together with any statement) under Article 19
pages NONE, filed with the demand
pages 18-24, filed with the letter of 24 August 2004 (24.08.2004)
- ☒ the drawings:
pages 1-10, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.
- ☐ the sequence listing part of the description:
pages NONE, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages NONE
- ☒ the claims, Nos. 2
- ☒ the drawings, sheets/fig NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. STATEMENT**

Novelty (N)	Claims <u>1,3-36</u>	YES
	Claims <u>NONE</u>	NO
Inventive Step (IS)	Claims <u>1,3-36</u>	YES
	Claims <u>NONE</u>	NO
Industrial Applicability (IA)	Claims <u>1,3-36</u>	YES
	Claims <u>NONE</u>	NO

2. CITATIONS AND EXPLANATIONS

Claims 1, and 3-36 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the claimed features of an air filter having electromagnetic energy absorptive characteristics including a porous substrate and an electrically absorptive material distributed substantially uniformly through the porous substrate, the electrically absorptive material being an electrical absorber in particulate form suspended in a binding agent nor the method of forming such an air filter. The closest prior art of record to Pierce(US Patent No. 5,431,974) and Hedrick et al(US Patent No. 5,506,047) disclose electromagnetic energy adsorptive filters but differ from the instant invention in that they fail to recite the feature of an electrically absorptive material distributed substantially uniformly through the porous substrate, the electrically absorptive material being an electrical absorber in particulate form suspended in a binding agent. Pierce and Hedrick et al only disclose a coated electrically conductive layer and not an electrically conductive material distributed through a porous substrate wherein the material is an electrical absorber in particulate form suspended in a binding agent. Thus the instant invention is both novel and unobvious over the prior art of record.

Claims 1 and 3-36 meet the criteria set out in PCT Article 33(4), and thus the instant invention has industrial applicability because the subject matter claimed can be made or used in industry.

WHAT IS CLAIMED IS:

1. An air filter having electromagnetic-energy absorptive characteristics, the filter comprising:

a porous substrate; and

an electrically absorptive material distributed substantially uniformly
5 through the porous substrate, said electrically absorptive material being an electrical absorber in particulate form suspended in a binding agent.
2. cancelled
3. The air filter of claim 1, wherein the electrical absorber is selected from the group consisting of carbon, carbon particles, carbon fibers, alumina, sapphire, silica, titanium dioxide, ferrite, iron, iron silicide, graphite, and composites of iron, nickel and copper.
4. The air filter of claim 1, wherein the binding agent is selected from the group consisting of an elastomer, a rubber and an epoxy.
5. The air filter of claim 1, wherein the electrically absorptive material further comprises a highly conductive material.

6. The air filter of claim 5, wherein the highly conductive material is selected from the group consisting of copper and aluminum.
7. The air filter of claim 1, further comprising a fire-retardant layer.
8. The air filter of claim 7, wherein the fire-retardant layer comprises a fire retardant selected from the group consisting of phosphates and antimony trioxide.
9. The air filter of claim 7, wherein the fire-retardant-treated porous substrate passes a self-extinguishing vertical burn requirement in accordance with Underwriters Laboratories Standard 94.
10. The air filter of claim 1, wherein the porous substrate comprises an open-cell reticulated polyurethane foam.
11. The air filter of claim 10, wherein the foam comprises at least about 10 pores per linear inch.
12. The air filter of claim 1, wherein the porous substrate comprises a fiberglass mat.
13. The air filter of claim 1, wherein the porous substrate comprises a non-woven polyester web.

14. The air filter of claim 1, further comprising an electrically conductive layer.
15. The air filter of claim 14, wherein said electrically conductive layer is an electrical conductor having an array of apertures through which air can flow.
16. The air filter of claim 14, wherein said electrically conductive layer is a conductive coating applied thereto.
17. The air filter of claim 14, wherein the electrically conductive layer comprises a honeycomb.
18. The air filter of claim 1, further comprising a frame fixedly attached to the porous substrate, wherein the frame provides physical support for the porous substrate.
19. The air filter of claim 1, wherein the porous substrate comprises a sheet having a thickness less than about 0.5 inches.
20. The air filter of claim 1, wherein the porous substrate provides at least 20 dB of attenuation to electromagnetic energy substantially occurring at frequencies at least between about 4 GHz and 18 GHz.
21. A method for producing an air filter having electromagnetic-energy-absorptive